08/994,758

REISSUE PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Reissue Application of

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For: PROJECTION EXPOSURE APPARATUS

Group Art Unit: 2851

Examiner: A. Mathews

Docket No.: 110157.99

SUBMISSION OF CURRENT CLAIMS

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

As requested by Examiner Mathews during a telephone conference on October 7, 2003, Applicant reproduces the currently pending claims of this reissue application below. No amendments are made by this document. Claims 1-9, 14-39, 41-43, 45, 49-55, 68-70, 72-74, 76, 80-84, 96-99, 101-103, 105, 109-115, 128-142 and 189 are pending. The original patent claims are reproduced with underlining to show any additions and with bracketing to show any deletions. Each original patent claim that has been cancelled is reproduced and entirely surrounded by brackets.

Current Claims:

1. An exposure apparatus for radiating exposure light on a predetermined illumination area on a mask on which a pattern to be transferred is formed, and exposing the pattern on a photosensitive substrate, comprising:

a scanning system for synchronously scanning the mask and the photosensitive substrate in a predetermined first direction of the illumination area while maintaining a predetermined speed ratio; and

an illumination condition setting portion for setting the illumination area to be rectangular, and letting a light intensity distribution of the illumination area in a second direction substantially perpendicular to the first direction have a trapezoidal shape so that a middle portion of the distribution exhibits a substantially constant light intensity, and two side portions of the distribution exhibit a gradually decreasing light intensity.

2. An apparatus according to claim 1, wherein said scanning system scans the mask and the photosensitive substrate at least twice in the first direction, and further comprising a substrate moving system for moving the photosensitive substrate in the second direction while first and second scanning operations with respect to the mask and the photosensitive substrate are performed by said scanning system.

3. An apparatus according to claim 2, further comprising a mask moving system for moving the mask in the second direction while first and second scanning operations with respect to the mask and the photosensitive substrate are performed by said scanning system.

4. An apparatus according to claim 2, further comprising:

storage portion for storing a relative positional difference between the mask and the photosensitive substrate when the mask and the photosensitive substrate are to be synchronously scanned in the first direction; and

a controller for controlling a position of at least of one of the mask and the photosensitive substrate such that the relative positional difference in the first scanning operation with respect to the mask and the photosensitive substrate coincides with that in the second scanning operation.

5. An apparatus according to claim 2, wherein said illumination condition setting portion determines a length M of each of the side portions, of the illumination area, in which the light intensity gradually decreases, in the second direction so as to establish

$$M=(n \bullet LP-LT)/(n+1)$$

where n is an integer of not less than one, LP is a length of an illumination area on the mask in the second direction, and LT is a width of a pattern area, formed on the mask, in the second direction.

6. An apparatus according to claim 5, further comprising a projection optical system for projecting an image of a pattern of the mask, irradiated with the exposure light, onto the photosensitive substrate at a projecting magnification .beta., and wherein a moving amount of the photosensitive substrate moved by said substrate moving system in the second direction is defined as

$$n \bullet (LP-M)/\beta.$$

7. A projection exposure apparatus comprising:

a pulse light source for pulse-emitting exposure light;

an illumination optical system for illuminating a predetermined illumination area on a mask, on which a pattern to be transferred is formed, with the exposure light;

a projection optical system for projecting an image of the pattern, irradiated with the exposure light, onto a photosensitive substrate;

a scanning system for synchronously scanning the mask and the photosensitive substrate at least twice in a predetermined first direction of the illumination area while maintaining a predetermined speed ratio;

a substrate moving system for moving the photosensitive substrate in a second direction substantially perpendicular to the first direction while first and second scanning operations with respect to the mask and the photosensitive substrate are performed by said scanning system; and

a controller for controlling at least one of said pulse light source and said scanning system such that a position of the photosensitive substrate in the first direction at the time when said pulse light source performs pulse emission, in the first scanning operation with respect to the photosensitive substrate and the mask coincides with that in the second scanning operation.

8. An apparatus according to claim 7, wherein said controller includes a position storage portion for detecting a position of the photosensitive substrate in the first direction when said pulse light source performs pulse emission, and storing data indicating the position, and controls one of said pulse light source and said synchronous scanning means on the basis of the stored data indicating the position of the photosensitive substrate.

9. (Three Times Amended) A scanning exposure apparatus comprising:

a projection optical system for projecting a pattern image of a mask onto a photosensitive substrate;

a scanning system for synchronously scanning [a] the mask and [a] the photosensitive substrate for scanning exposure, wherein said scanning system includes a mask stage for scanning the mask in a direction perpendicular to an optical axis of said projection optical system and a substrate stage for scanning the substrate in the direction perpendicular to the optical axis, and causes the mask stage and the substrate stage to scan at a speed ratio corresponding to a projecting magnification of said projection optical system; [and]

a first measuring system for measuring a position of the mask within a plane perpendicular to said optical axis, wherein said first measuring system includes a rotational angle detecting device for detecting a rotational angle of the mask within the plane perpendicular to said optical axis;

a second measuring system for measuring a position of the substrate within a plane perpendicular to said optical axis; and

an adjusting system for moving the mask to decrease a positional deviation between the mask and the substrate, independently of scanning of the mask which is performed by said scanning system, during the scanning exposure, wherein said adjusting system includes a finely movable stage for relatively moving the mask on said mask stage, a driving member for finely driving said finely movable stage in the direction perpendicular to said optical axis, and a controller for controlling the driving member in accordance with signals from said first and second measuring systems.

[10. (Cancelled) An apparatus according to claim 9, further comprising

a projection optical system for projecting a pattern image of the mask onto the substrate; and wherein

said scanning system includes a mask stage for scanning the mask in a direction perpendicular to an optical axis of said projection optical system and a substrate stage for scanning the substrate in the direction perpendicular to the optical axis, and causes the mask stage and the substrate stage to scan at a speed ratio corresponding to a projecting magnification of said projection optical system.]

[11. (Cancelled) An apparatus according to claim 10, wherein

said adjusting system includes a finely movable stage for relatively moving the mask on said mask stage and a driving member for finely driving said finely movable stage in the direction perpendicular to said optical axis.]

[12. (Cancelled) An apparatus according to claim 11, further comprising:

a first measuring system for measuring a position of the mask within a plane perpendicular to said optical axis; and

a second measuring system for measuring a position of the substrate within a plane perpendicular to said optical axis, and wherein

said adjusting system includes a controller for controlling the driving member in accordance with signals from said first and second measuring systems.]

[13. (Cancelled) An apparatus according to claim 12, wherein

said first measuring system includes a rotational angle detecting device for detecting a rotational angle of the mask within the plane perpendicular to said optical axis.]

14. (Amended) An apparatus according to claim [13] 9, wherein

said finely movable stage includes a mirror having a reflecting surface substantially perpendicular to said plane, and

said first measuring system includes an interferometer for radiating a light beam onto said reflecting surface and receiving the light beam reflected by said reflecting surface.

15. (Amended) A scanning exposure apparatus for projecting a pattern image of a mask onto a sensitive plate through a projection optical system in a scanning manner, the exposure apparatus comprising:

(a) a plate stage for scanning the plate in at least one-dimensional direction under said projection optical system for the scanning exposure;

(b) a first mask stage for scanning the mask in at least said one-dimensional direction above said projection optical system for the scanning exposure;

(c) a second mask stage for finely moving the mask on said first mask stage in each of translational and rotational directions;

(d) a first driving system for synchronously driving said plate stage and said first mask stage with a predetermined velocity ratio for the scanning exposure, wherein said first driving system includes a mask driving unit for moving the first mask stage and a plate driving unit for moving said plate stage;

(e) a detecting system for detecting a positional deviation amount between the mask and the plate in a real time manner during the scanning exposure; and

(f) a second driving system for driving said second mask stage to decrease the detected deviation amount during the scanning exposure, while said plate stage and said first mask stage are moved by said first driving system.

16. The scanning exposure apparatus according to claim 15, wherein said detecting system includes a first measuring unit to detect a relative translational deviation amount between the mask and the plate and a second measuring unit to detect a relative rotational deviation amount between the mask and the plate.

17. The scanning exposure apparatus according to claim 16, wherein said second drive system includes a first actuator unit for finely moving said second mask stage in said one-dimensional scanning direction and in a cross direction of said scanning direction based on said translational deviation amount.

18. The scanning exposure apparatus according to claim 16, wherein said second drive system includes a second actuator unit for finely rotating said second mask stage about a predetermined point on the mask based on said rotational deviation amount.

19. The scanning exposure apparatus according to claim 18, wherein said predetermined point on the mask is changed in said one-dimensional scanning direction according to the scanning position of the mask.

20. The scanning exposure apparatus according to claim 16, wherein said first and second measuring units include a mask side interferometer system for measuring a coordinate

position and a rotational angle of the mask and a plate side interferometer system for measuring a coordinate position and a rotational angle of the plate.

21. The scanning exposure apparatus according to claim 15, wherein each of said plate stage and said first mask stage is linearly movable in said one-dimensional scanning direction by restraining of respective linear air-guide structures.

22. The scanning exposure apparatus according to claim 21, wherein said first driving system includes a mask side linear motor for driving said first mask stage guided by the corresponding linear air-guide structure and a plate side linear motor for driving said plate stage guided by the corresponding linear air-guide structure.

23. A scanning exposure apparatus for projecting a pattern image of a mask onto a sensitive plate through a projection optical system in a scanning manner, the exposure apparatus comprising:

(a) a plate stage for moving the plate in at least one-dimensional direction under said projection optical system which has an imaging reduction ratio 1/β;

(b) a first mask stage for moving the mask in at least said one-dimensional direction above said projection optical system;

(c) a second mask stage for finely moving the mask on said first mask stage in each of translational and rotational directions;

(d) an illuminating system for irradiating the mask with a radiation having a slit shaped distribution elongated perpendicular to said one-dimensional direction on the mask in order to project a slit shaped partial pattern image of the mask onto the plate through said projection optical system;

(e) a first driving system for synchronously, relatively driving said plate stage and first mask stage with a velocity ratio β for the scanning exposure of the plate by said slit shaped partial pattern image of the mask;

(f) a detecting system for detecting a deviation amount from an ideal positional relation of the mask and the plate occurring at a term of the scanning exposure; and

(g) a second driving system for driving said second mask stage to correct the deviation during the scanning exposure when said detected deviation amount is out of a predetermined tolerance.

24. The scanning exposure apparatus according to claim 23, wherein said detecting system includes a first measuring system to detect a translational deviation amount from said ideal positional relation of the mask and the plate and a second measuring system to detect a rotational deviation amount from said ideal positional relation of the mask and the plate.

25. The scanning exposure apparatus according to claim 24, wherein said second drive system includes a first actuator system for finely moving said second mask stage in said one-dimensional scanning direction and a cross direction thereof based on said translational deviation amount.

26. The scanning exposure apparatus according to claim 24, wherein said second drive system includes a second actuator system for finely rotating said second mask stage about a predetermined point on the mask based on said rotational deviation amount.

27. The scanning exposure apparatus according to claim 26, wherein said predetermined point on the mask is changed in said one-dimensional scanning direction according to the scanning position of the mask.

28. The scanning exposure apparatus according to claim 23, wherein said first driving system includes a mask side linear motor for driving said first mask stage supported by an air-guide structure and a plate side linear motor for driving said plate stage supported by an air-guide structure.

29. (Twice Amended) A scanning exposure apparatus for projecting a pattern image of a mask onto a sensitive plate through a projection system having a predetermined magnification ratio in a scanning manner, the apparatus comprising:

(a) a scanning system for synchronously, relatively scanning the mask and the plate with respect to a projection field of said projection system at a velocity ratio corresponding to said magnification ratio during the scanning exposure, wherein the scanning system includes a mask driving unit and a plate driving unit, and wherein the mask and the plate are moved synchronously using the mask driving unit and the plate driving unit during the scanning exposure;

(b) a finely movable stage provided on said scanning system for finely moving the mask relative to said scanning system in each of translational and rotational directions;

(c) a detecting system for detecting a positional deviation amount between an ideal positional relation and an actual positional relation of the mask and the plate during the scanning exposure, wherein said detecting system includes a first interferometer system to measure positional information of the mask and a second interferometer system to measure positional information of the plate, and wherein said finely movable stage has a reflection surface, and said first interferometer system measures the positional information of the mask by applying a measuring beam to the reflection surface; and

(d) a control system for driving said finely movable stage based on said detected deviation amount in order to decrease the positional deviation of the mask and the plate.

30. (Twice Amended) A scanning exposure method in which a pattern area of a mask is transferred onto a sensitive plate through a projection optical system in a scanning manner, the method comprising [the steps of]:

(a) irradiating the mask with a radiation having a slit shaped intensity distribution in order to project a slit image portion of said pattern area of the mask toward the plate through said projection optical system;

(b) synchronously scanning each of the mask and the plate relative to said projection optical system in a scanning direction perpendicular to a longitudinal direction of said slit image portion at a predetermined velocity ratio by using a scanning mechanism for the scanning exposure, wherein the scanning mechanism includes a mask driving unit for moving the mask and a plate driving unit for moving the plate;

(c) detecting a deviation value between an ideal positional relation and an actual positional relation of the mask and the plate at a term of the scanning exposure by using a first measuring system to measure positional information of the mask and a second measuring system to measure positional information of the plate; and

(d) correcting a position of the mask determined by said scanning mechanism so as to decrease said detected deviation value by using a fine moving mechanism provided on said scanning mechanism at the term of the scanning exposure.

31. The scanning exposure method according to claim 30, wherein said detecting step includes detecting a relative rotational deviation between the mask and the plate and said fine moving mechanism finely rotates the mask to decrease said rotational deviation.

32. The scanning exposure method according to claim 31, wherein said relative rotational deviation is detected by using a mask side interferometer system and a plate side interferometer system.

33. (Three Times Amended) A scanning exposure method in which a pattern area of a mask is transferred onto a sensitive plate through a projection system in a scanning manner, the method comprising [the steps of]:

(a) irradiating the mask with a radiation in order to project an image portion of said pattern area of the mask onto the plate through said projection system;

(b) synchronously scanning each of the mask and the plate relative to said projection system in a scanning direction at a predetermined velocity ratio by using a scanning mechanism for the scanning exposure, wherein the scanning mechanism includes a mask driving unit for moving the mask and a plate driving unit for moving the plate, and wherein the mask and the plate are moved in accordance with an imaging reduction ratio of the projection system;

(c) detecting a deviation between an ideal positional relation and an actual positional relation of the mask and the plate at a term of the scanning exposure by using a first measuring system to measure positional information of the mask and a second measuring system to measure positional information of the plate; and

(d) correcting a position of the mask determined by said scanning mechanism for decreasing said detected deviation by using a fine moving mechanism provided on said scanning mechanism at the term of the scanning exposure.

34. A scanning exposure apparatus for projecting a pattern image of a mask onto a sensitive plate through a projection system in a scanning manner, the exposure apparatus comprising:

(a) a plate stage for moving the plate under said projection system in an X direction for the scanning exposure and in a Y direction perpendicular to the X direction;

(b) a first mask stage for moving the mask in the X direction for the scanning exposure above said projection system;

(c) a second mask stage for finely moving the mask on said first mask stage in each of translational and rotational directions;

(d) first driving means for synchronously driving each of said plate stage and said first mask stage with a predetermined velocity ratio in the X direction during the scanning exposure; and

(e) second driving means for driving said plate stage and said second mask stage to maintain a translational relation of the mask and plate in the Y direction and for driving said second mask stage to maintain a relative rotational relation of the mask and the plate, during the scanning exposure.

35. (Amended) A scanning exposure apparatus for projecting a pattern image of a mask onto a sensitive plate through a projection system having a predetermined magnification ratio in a scanning manner, the apparatus comprising:

(a) a scanning system which has a first driving system to move the mask and a second driving system to move the plate and which synchronously scans the mask and the plate with respect to a projection field of said projection system at a velocity ratio corresponding to said magnification ratio during a scanning exposure;

(b) a finely movable stage, connected to said scanning system, which moves the mask relative to said scanning system;

(c) a detector which detects a positional deviation amount between the mask and the plate during the scanning exposure; and

(d) a control system, connected to said finely movable stage and said detector, which drives said finely movable stage based on said detected deviation amount during the scanning exposure.

36. (Four Times Amended) A scanning exposure method in which a pattern of a mask is transferred onto a sensitive plate through a projection system in a scanning manner, the method comprising:

(a) irradiating the mask with a radiation in order to project an image of said pattern of the mask onto the plate through said projection system;

(b) synchronously scanning each of the mask and the plate relative to said projection system by using a scanning mechanism for a scanning exposure, wherein the scanning mechanism includes a mask driving unit for moving the mask and a plate driving unit for moving the plate, and wherein a scanning velocity of the mask is different from a scanning velocity of the plate;

(c) detecting a positional deviation amount between the mask and the plate at a term of the scanning exposure by using a first interferometer to measure positional information of the mask and a second interferometer to measure positional information of the plate; and

(d) correcting a position of the mask determined by said scanning mechanism for decreasing said detected deviation using a fine moving mechanism at the term of the scanning exposure.

37. (Four Times Amended) A scanning exposure apparatus in which a first object is moved in a first direction and a second object is moved in a second direction for scanning exposure, the apparatus comprising:

a projection system for the scanning exposure, which is disposed in an optical path of an exposure beam, the first object being provided on one side of the projection system and the second object being provided on the other side of the projection system;

a first driving system which moves the first object in the first direction, at least a part of the first driving system being on the one side of the projection system;

a second driving system which moves the first object in a plane substantially parallel to the surface of the first object while the first object is moved by the first driving

system, at least a part of the second driving system being on the one side of the projection system;

a third driving system which moves the second object in the second direction, at least a part of the third driving system being on the other side of the projection system;

a first movable member which is movable in the first direction; and

a second movable member which is movable relative to the first movable member and which holds the first object,

wherein the first object held by the second movable member is moved in the first direction by moving the first movable member using the first driving system, and the first object is moved relative to the first movable member by moving the second movable member using the second driving system, and

wherein the first object and the second object are synchronously moved by the first driving system and the third driving system.

38. An apparatus according to claim 37, wherein the first object includes a mask having a pattern area, and the second object includes a work-piece on which a pattern of the mask is transferred.

39. (Amended) An apparatus according to claim 38, wherein said second driving system rotates said first object.

41. An apparatus according to claim 37, wherein said first driving system includes a linear motor.

42. (Amended) An apparatus according to claim 41, wherein said third driving system includes a linear motor.

43. (Amended) An apparatus according to claim 37, further comprising:

a detecting system which detects a relative relationship between the first object and the second object, wherein the second driving system moves the second movable member based on the detected relationship.

45. An apparatus according to claim 43, wherein said detecting system includes an interferometer.

49. (Twice Amended) An apparatus according to claim 37, wherein at least a part of said second driving system is provided on said first movable member.

50. (Twice Amended) An apparatus according to claim 37, further comprising:

a reflective surface disposed on the second movable member; and

an interferometer, optically connected to the reflective surface, which is used for detecting positional information of the first object.

51. (Twice Amended) An apparatus according to claim 37, wherein the second driving system moves the second movable member without a weight of the first movable member.

52. (Amended) An apparatus according to claim 37, wherein the exposure beam irradiated onto said first object defines a rectangular illumination area on said first object, said first direction and said second direction are parallel and reverse to one another, said projection system has a reduction magnification, and a scanning speed of said first object is different from a scanning speed of said second object.

53. An apparatus according to claim 37, wherein said projection system includes a reflective and refractive optical system.

54. (Amended) An apparatus according to claim 38, wherein said second driving system moves said mask before the pattern area of said mask begins to be illuminated with the exposure beam.

55. (Amended) An apparatus according to claim 37, wherein:

the second driving system operates to correct a positional relationship between the first object and the second object during a synchronous movement of the first object and the second object.

68. (Three Times Amended) A scanning exposure method in which a first object is moved in a first direction and a second object is moved in a second direction for a scanning exposure, the method comprising:

moving a first object in the first direction by using a first driving system;

shifting the first object in a plane substantially parallel to a surface of the first object by using a second driving system while the first object is moved by the first driving system, wherein the first driving system moves a first movable member, the second driving system shifts a second movable member, which supports the first object, relative to the first movable member, and wherein the first object is moved in the first direction by moving the first movable member using the first driving system and is shifted by shifting the second movable member using the second driving system; and

moving a second object in the second direction by using a third driving system,

wherein the first object and the second object are synchronously moved by the first driving system and the third driving system.

69. A method according to claim 68, wherein the first object includes a mask having a pattern area, and the second object includes a work-piece on which a pattern of the mask is transferred.

70. (Amended) A method according to claim 69, wherein said second driving system rotates said first object.

72. A method according to claim 68, wherein said first driving system includes a linear motor.

73. (Amended) A method according to claim 72, wherein said third driving system includes a linear motor.

74. A method according to claim 68, further comprising:

detecting a relative relationship between the first object and the second object.

76. (Amended) A method according to claim 74, wherein said relative relationship is detected by an interferometer system including a first interferometer unit and a second interferometer unit which detect positional information of the first and second objects respectively.

80. (Twice Amended) A method according to claim 68, wherein at least a part of said second driving system is provided on said first movable member.

81. (Twice Amended) A method according to claim 68, wherein the second driving system shifts the first object without a weight of the first movable member.

82. (Amended) A method according to claim 68, wherein an exposure beam irradiated onto said first object defines a rectangular illumination area on said first object, said first direction and said second direction are parallel and reverse to one another, a projection system for the scanning exposure has a reduction magnification, and a scanning speed of said first object is different from a scanning speed of said second object.

83. (Amended) A method according to claim 69, wherein said second driving system shifts said mask before the pattern area of said mask begins to be illuminated with an exposure beam.

84. (Amended) A method according to claim 68, wherein:

the second driving system operates to correct a positional relationship between the first object and the second object during a synchronous movement of the first object and the second object.

96. (Three Times Amended) A method of manufacturing a circuitry element with use of the method as defined in claim 68, wherein the circuitry element is formed on a substrate by projecting a pattern of a mask onto the substrate during the scanning exposure, the substrate is one of the first and second objects, and the mask is the other of the first and second objects.

97. (Three Times Amended) A method for making a scanning exposure apparatus in which a first object is moved in a first direction and a second object is moved in a second direction for a scanning exposure, the method comprising:

providing a projection system for the scanning exposure, which is disposed in an optical path of an exposure beam, the first object being provided on one side of the projection system and the second object being provided on the other side of the projection system;

providing a first driving system which moves the first object in the first direction, at least a part of the first driving system being on the one side of the projection system;

providing a second driving system which moves the first object in a plane substantially parallel to a surface of the first object while the first object is moved by the first driving system, at least a part of the second driving system being on the one side of the projection system;

providing a third driving system which moves the second object in the second direction, at least a part of the third driving system being on the other side of the projection system;

providing a first movable member which is movable in the first direction; and

providing a second movable member which is movable relative to the first movable member and which holds the first object,

wherein the first object held by the second movable member is moved in the first direction by moving the first movable member using the first driving system, and the first object is moved relative to the first movable member by moving the second movable member using the second driving system, and

wherein the first object and the second object are synchronously moved by the first driving system and the third driving system.

98. A method according to claim 97, wherein the first object includes a mask having a pattern area, and the second object includes a work-piece on which a pattern of the mask is transferred.

99. (Amended) A method according to claim 98, wherein said second driving system rotates said first object.

101. A method according to claim 97, wherein said first driving system includes a linear motor.

102. (Amended) A method according to claim 101, wherein said third driving system includes a linear motor.

103. (Amended) A method according to claim 97, further comprising:

providing a detecting system which detects a relative relationship between the first object and the second object, wherein the second driving system moves the second movable member based on the detected relationship.

105. A method according to claim 103, wherein said detecting system includes an interferometer.

109. (Twice Amended) A method according to claim 97, wherein at least a part of said second driving system is provided on said first movable member.

110. (Twice Amended) A method according to claim 97, further comprising:

providing a reflective surface disposed on the second movable member; and

providing an interferometer, optically connected to the reflective surface, which is used for detecting positional information of the first object.

111. (Twice Amended) A method according to claim 97, wherein the second driving system moves the second movable member without a weight of the first movable member.

112. (Amended) A method according to claim 97, wherein the exposure beam irradiated onto said first object defines a rectangular illumination area on said first object, said first direction and said second direction are parallel and reverse to one another, said projection system has a reduction magnification, and a scanning speed of said first object is different from a scanning speed of said second object.

113. A method according to claim 97, wherein said projection system includes a reflective and refractive optical system.

114. (Amended) A method according to claim 98, wherein said second driving system moves said mask before the pattern area of said mask begins to be illuminated with the exposure beam.

115. (Amended) A method according to claim 97, wherein:

the second driving system operates to correct a positional relationship between the first object and the second object during a synchronous movement of the first object and the second object.

128. (Twice Amended) A method of manufacturing a circuitry element with use of a scanning exposure apparatus made by the method as defined in claim 97.

129. (Amended) An apparatus according to claim 39, wherein during movement of said mask by said first driving system, said second driving system rotates said mask about a rotation axis passing through a predetermined point in an illumination region of said exposure beam irradiated to said mask.

130. (Twice Amended) An apparatus according to claim 37, further comprising:

a first measuring device which detects positional information of the first object; and

a second measuring device which detects positional information of the second object; and

wherein the second driving system moves the second movable member based on the positional information detected by the first and second measuring devices.

131. (Amended) An apparatus according to claim 130, wherein:

said first measuring device includes a first interferometer system, and said second measuring device includes a second interferometer system.

132. (Amended) An apparatus according to claim 37, further comprising:

a fourth driving system which moves said second object in a plane which is substantially parallel to a surface of the second object and in a direction crossing said second direction, at least a part of the fourth driving system being disposed on the other side of the projection system.

133. (Amended) A method according to claim 70, wherein during movement of said mask by said first driving system, said second driving system rotates said mask about a rotation axis passing through a predetermined point in an illumination region of an exposure beam irradiated to said mask.

134. A method according to claim 68, wherein said first driving system is capable of moving said first object by a longer distance than that moved by said second driving system.

135. (Twice Amended) A method according to claim 68, wherein during movement of said first object by said first driving system, at least a portion of said second driving system moves in said first direction in order to shift said first object.

136. A method according to claim 74, wherein said second driving system moves the first object based on the detected relative relationship.

137. (Twice Amended) A method according to claim 68, further comprising:

measuring positional information of the first object; and

measuring positional information of the second object,

wherein said positional information of the first object includes positional information of said first object in a direction which crosses said first direction,

said positional information of the second object includes positional information of said second object in a direction which crosses said second direction, and

wherein said second driving system shifts the second movable member based on the measured positional information of the first and second objects.

138. (Twice Amended) A method according to claim 68, further comprising:

measuring positional information of the first object; and

measuring positional information of the second object,

wherein said positional information of the first object includes information on rotation of the first object;

said positional information of the second object includes information on rotation of the second object, and

wherein said second driving system shifts the second movable member based on the measured positional information of the first and second objects.

139. (Amended) A method according to claim 99, wherein during movement of said mask by said first driving system, said second driving system rotates said mask about a rotation axis passing through a predetermined point in an illumination region of said exposure beam irradiated onto said mask.

140. (Amended) A method according to claim 97, further comprising:

providing a fourth driving system which moves said second object in a plane which is substantially parallel to a surface of the second object and in a direction which crosses said second direction, at least a part of the fourth driving system being disposed on the other side of the projection system.

141. (Twice Amended) A method according to claim 97, further comprising:

providing a first measuring device which detects positional information of the first object; and

providing a second measuring device which detects positional information of the second object; and

wherein the second driving system moves the second movable member based on the positional information detected by the first and second measuring devices.

142. (Twice Amended) A method according to claim 141, wherein

said first measuring device includes a first interferometer system, and said second measuring device includes a second interferometer system.

189. A method according to Claim 68, wherein during the scanning exposure, speed of said first object is controlled by using said first driving system and position of said first object is controlled by using said second driving system.

REMARKS

Claims 1-9, 14-39, 41-43, 45, 49-55, 68-70, 72-74, 76, 80-84, 96-99, 101-103, 105, 109-115, 128-142 and 189 are pending.

Should the Patent Office require anything further, the Examiner is invited to contact Applicant's undersigned attorney at the telephone number set forth below.

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MAC/ccs

Date: October 7, 2003

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